KLEINFELDER

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Appendix D

APPENDIX D – ACTION PLAN MATRIX

Demolition Action Plan Matrix

Component	Description	Location	Demolition, Removal, and Disposal Sequence	Permits and Regulatory Requirements	Specialized Consultant or Construction Service Requirements	Estimated Duration (Days)	Estimated Cost
Erosion and Sediment Control Measures	Erosion and sediment control measures are required to be installed prior to commencement of demolition, and the measures will require inspection and maintenance during construction operations.	The erosion and sediment control measures will be placed throughout the site per approved plan.	Install all erosion and sediment control measures in locations shown on approved Erosion and Sedimentation Control Plan. Inspect and maintain measures throughout project per the requirements given in approved E&SC plan.	Refer to Section 4.0 for permitting and regulatory requirements.	No specialized service requirements are foreseen.	2	$15,000
Dewatering Phase 1	A number of treatment plant components on the site are currently filled with water and this water will need to be removed prior to demolition.	Throughout Site. Keynote #1 on Overall Site Plan in Appendix C	Begin dewatering operations at the primary clarifier. Dewatering the primary clarifier should also dewater the headworks structure and influent sewer piping. Pump effluent from dewatering operations into the existing lagoon on-site. All solids remaining in the lagoon after dewatering activities are complete will be removed offsite in an environmentally safe and legal manner.	Refer to Section 4.0 for permitting and regulatory requirements.	No specialized service requirements are foreseen.	4	$8,000
Influent Sewer Removal (Upstream of Influent MH to Headworks)	Inflow to the treatment plant flowed into a manhole in the center of the site through: a 6" force main from the east; an 8" force main from the east; and a 21" gravity concrete pipe from the south. A 15" gravity concrete pipe may flow to the manhole from the south. A 21" concrete pipe connects the influent manhole to the headworks.	Keynote # 2 on Overall Site Plan in Appendix C	Upon completion of dewatering, begin removal of influent sewer pipes and manholes. All pipe removed at this time shall be excavated and disposed of off-site. Beginning at the influent manhole upstream of the headworks structure, remove 15" and 21" concrete gravity pipe and 6" and 8"force main. A 6" line from the former humus ponds may have been abandoned in place previously. If this line is still in place, it shall be removed. After the pipes upstream of the manhole have been removed, the manhole and remaining 60 LF of 21" concrete pipe connected to the headworks structure can be removed. Trenches shall be backfilled with suitable material, compacted, and re-seeded.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	4	$27,600
Headworks Removal	The plant headworks consist of screening and grit removal equipment. The headworks serve as the first step in the treatment process by removing solid material from the sewage. The headworks and all associated equipment will need to be removed following the influent sewer removal.	Keynote #3 on Overall Site Plan in Appendix C	Pump out any water remaining in the headworks structure prior to removing equipment or beginning excavations. Begin headworks demolition by removing above ground fixtures. Next, remove below ground components of the headworks. Demolish and remove the concrete structure and channels. While removing the structure, contractor shall also remove the 20" headworks bypass pipe up to the blind flange shown in Figure 3 and as much of the 21" concrete pipe leading to the screw pumps and influent gallery as necessary to facilitate excavation and removal of the headworks. Dispose of demolition materials offsite. Following removal of clarifier walls, remove dewatering pipes and dewatering manholes located adjacent to the primary clarifier. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	4	$5,600
Primary Clarifier Removal	The primary clarifier allowed heavier particles to settle out of the slow moving wastewater. The primary clarifier has an influent pipe, influent bypass pipe, bypass lines, and an effluent pipe connected to it. There are also various supernatant, scum, and sludge pipes connected to the primary clarifier. The primary clarifier should be removed following the demolition and removal of the headworks structure and equipment.	Keynote #4 on Overall Site Plan in Appendix C	Check any valves connected to the supernatant, scum, and sludge pipes to be sure they are open and to ensure that they were also drained during the initial dewatering phase. After any remaining water has been removed from the clarifier, removal can begin. Begin dismantling the primary clarifier from the top down. When all the interior piping has been removed, the interior walls and weirs can be removed. Next, the concrete outer walls and base can be demolished and removed. At this time, the supernatant, scum, and sludge piping around the clarifier can also be removed. After excavations have begun, plug the upstream end of the original 24" effluent line from the clarifier discharge and the 24" bypass line to the outfall. Next, the 12" influent, 20" headworks bypass lines, and an 8" emergency RAS line can also be removed from the primary clarifier to the headworks. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	6	$65,200
Screw Pumps and Control Building Removal	The screw pumps and control building were originally intended to be the "heart" of the plant with all flow travelling through here and being directed to the appropriate treatment stage. The screw pump outlets into two pipes. The influent gallery drains an influent pipe from the headworks, a pipe connected to the primary clarifier, and a pipe from the secondary clarifier. The screw pumps and control building will need to be removed once the primary clarifier has been demolished and removed.	Keynote #5 on Overall Site Plan in Appendix C	After dewatering the influent gallery and control building basement, demolish and remove the control building structure and disinfection building adjacent to screw pumps. Next, begin removing the screw pumps and appurtenances from the influent gallery. In addition to the pipes connected to the influent gallery, there are several supernatant and sludge pipes and pumps connected to and in the control building basement. All of the pipes, pumps, electrical conduit, railings, and any other appurtenances will need to be removed prior to demolishing the concrete walls and influent gallery. When all of the equipment has been removed, demolition can begin on the concrete. During excavation, make sure that pipes are properly drained, and do not spill into the open trenches. Next, the remainder of the 21" pipe to the headworks and the 16" pipe to the primary clarifier can be removed. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Abatement of asbestos-containing materials (as noted in Section 4.2) must be conducted prior to disturbing these materials and be performed by a qualified licensed asbestos abatement contractor.	5	$54,800
Aeration Basin Removal	The purpose of the aeration basin was to introduce air into the wastewater, improving the removal of pollutants. The basin has an influent and effluent pipe. The aeration basin will need to be removed once the screw pumps and control building demolition activities are complete.	Keynote #6 on Overall Site Plan in Appendix C	After dewatering the aeration basin, start by removing the rotors, electric motors and controls, brushes and bridges at the top of the aeration basin. Remove any interior piping or conduit. After removing the rotors, interior piping, and metal railings, demolish and remove the concrete structure. The remainder of the influent pipe from the screw pumps can be removed at this time. Only remove the portion of the effluent pipe necessary to allow removal of all of the concrete structure. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	9	$98,700

Component	Description	Location	Demolition, Removal, and Disposal Sequence	Permits and Regulatory Requirements	Specialized Consultant or Construction Service Requirements	Estimated Duration (Days)	Estimated Cost
Secondary Clarifier Removal	The secondary clarifier receives effluent from the aeration basin and discharges to the chlorine contact tank. Concrete sludge lines run from the clarifier to the screw pump and control building. Discharge from the secondary clarifier to the chlorine contact tank is via a perimeter weir and effluent gallery discharging into a sump. A 21" concrete pipe conveys secondary effluent to the flow measuring chamber in the chlorine contact tank.	Keynote #7 on Overall Site Plan in Appendix C	Dewater any remaining water in the secondary clarifier prior to removal of the concrete structure and piping. After any remaining water has been removed from the clarifier, removal can begin. Begin dismantling the secondary clarifier from the top down. Remove the existing metal bridge that runs from the outside of the clarifier to the center of the clarifier. When all the interior piping has been removed, the interior walls and weirs can be removed. Following removal of all metal and piping inside the clarifier, the concrete outer walls and base can be demolished and removed. Remove dewatering pipes and dewatering manhale adjacent to the secondary clarifier. After excavations have begun, plug the upstream end of the original 21" effluent line from the clarifier discharge to the outfall. At this time, the 16" influent, 14" concrete return sludge line, and a 6" diameter waste sludge line and drain can also be removed. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	6	$81,600
Chlorine Contact Basin Removal	The chlorine contact tank included a flow measuring flume in the influent gallery. Chlorine was injected into the secondary effluent immediately upstream of the flume. Water then travelled through serpentine chambers prior to discharge into a 30" concrete discharge pipe to the river. Ultraviolet disinfection equipment was installed in the disinfection tank along with a new jib crane and a new disinfection station adjacent to the screw pumps.	Keynote #8 on Overall Site Plan in Appendix C	Dewater any remaining water in the chlorine contact basin. Begin dismantling the chlorine contact basin from the top down. Remove the existing jib crane that is located alongside the chlorine contact basin. Following removal of the metalworks, electrical/UV equipment, and crane, the interior concrete basin walls can be removed. Next, demolish and remove the concrete outer walls and the basin foundation. Remove dewatering pipes and dewatering manhole adjacent to the secondary clarifier. After excavations have begun, plug the upstream end of the original 30" concrete pipe from the chlorine contact tank discharge to the outfall. At this time, the 21" concrete pipe can be removed from the chlorine contact basin to the secondary clarifier. Next, the 30" concrete pipe, running from the contact basin to Sandy River, can be removed. Stormwater pipes and bypass lines in the vicinity of the site will be removed next. Also at this time, the concrete bypass pipes that flow to Sandy River should be removed. Finally, the 24" effluent pipe from the primary clarifier to the manhole located on the bypass line can be removed. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	10	$92,900
Primary and Secondary Digester Removal	The new digesters consisted of two 300,000 gallon digester tanks with floating covers, a gravity thickener, new pumps, boilers, and yard piping. Between the digesters is a pump room housing pumps for digester feed, heat exchanger feed, and sludge loading. The pump room is located on the lower level, with the boilers located on the upper. A gravity thickener is located immediately to the north of the digesters.	Keynote #9 on Overall Site Plan in Appendix C	Remove any water in the digesters, gravity thickener, and heat exchange room/control room. Vegetation may need to be cleared to allow access. Next, remove all interior components within the primary and secondary digester. Begin dismantling the primary and secondary digester from the top down. It is anticipated that the digesters, pumps, and piping will contain residual sludge and solids. Pump all sludge and solids from the digesters and pipes into the lagoon. The gravity thickener which is located directly north of the secondary digester can now be removed. Next, remove the heat exchange/control building. All interior pipes, walls, metalworks, and electrical components should be removed in both levels of the building. The concrete sludge loading dock can now be removed along with a catch basin. At this time the 6" ductile iron and concrete stormwater pipes can be removed. Two catch basins will need to be removed during the demolition of the stormwater pipes. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	15	$203,900
Lab Building Removal	The existing laboratory building houses office areas, a restroom, rotary blowers, a sludge pump, chlorine disinfection equipment, and laboratory space. A sludge loading area was located outside the building. A 6" cast iron pipe supplied sludge to the sludge pump from the digester in the primary clarifier. A 6" cast iron main carried discharge from the pump to the sludge loading area.	Keynote #10 on Overall Site Plan in Appendix C	First, demolish all interior walls, appurtenances, and metalworks. Next, begin dismantling the lab building from the top down, removing all roofing, walls, framing, and the building foundation. The sludge loading dock which is located just to the southeast of the lab building can now be removed. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	5	$6,800
Wastewater Management Site Removal	The Waste Management site was constructed in the mid-1990's to produce a commercial soil conditioning product from heavily chlorinated sludge. The operations building and dump stations occupy the center of the site. The dump stations are constructed of concrete and include a concrete pad where transfer trucks parked to discharge sludge into the system, a grated dumping gallery at each dump station, a holding tank, and discharge piping to the sludge storage tank. A holding tank below the first bed collects filtrate water for each bed.	Keynote #11 on Overall Site Plan in Appendix C	Remove any water in the operations building, filtrate storage tank, sludge tank, and all other underground tanks/enclosures. Begin dismantling the above ground filtrate and storage tanks from the top down, removing all railing, piping, metalworks, and electrical components. The operations building which is located in the center of the site can now be removed. Next, remove the two concrete pads located to the west and northeast of the operations building along with the two dumping stations and the underground holding tank. At this time, all of the wooden storage sheds located on the north part of the site should be removed. Next, remove the drying beds located on the south part of the site. During removal of the drying beds floor, the 72' receiving trough and associated receiving tank with pump should be removed. Two catch basins located to the west of the drying beds should be removed next. At this time, the ductile iron and PVC pipes on the site can also be removed. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Abatement of asbestos-containing materials (as noted in Section 4.2) must be conducted prior to disturbing these materials and be performed by a qualified licensed asbestos abatement contractor.	15	$122,600

Component	Description	Location	Demolition, Removal, and Disposal Sequence	Permits and Regulatory Requirements	Specialized Consultant or Construction Service Requirements	Estimated Duration (Days)	Estimated Cost
Lagoon Removal	The lagoon currently found on the southern portion of the site was designed in the 1993 as part of the Phase 2 plant improvement project. Since the lagoon is holding water, it is assumed that the integrity of the liner is sound below the current water level. During the demolition of the facility, dewatering will be accomplished by pumping to the lagoon.	Keynote #12 on Overall Site Plan in Appendix C	Demolition of the lagoon should begin with pumping decanted water that is in the lagoon into a nearby sewer with approval of the City. Remove the inlet, outlet, and other perimeter structures around the lagoon. Next, remove the concrete anchors, the HDPE liner, and gunnite ballast cover along the bottom of the lagoon should be removed. After this, remove the concrete barge landing that serves as the entrance to the lagoon. Finally, the ductile iron pipes at the site will need to be removed. Dispose of demolition materials offsite. Backfill the lagoon and trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	15	$248,200
Removal of Underground Pipes (Throughout Project)	Small waterlines and drain lines will be encountered throughout this project and should be removed to the greatest extent practicable when encountered. Only the 8" and 6" waterlines that connect to the existing fire hydrant on site are to remain.	Keynote #13 on Overall Site Plan in Appendix C	All on-site waterline and drain lines should be removed as they are encountered during demolition and removal activities. These lines should be removed to the greatest extent practical whenever encountered. Any remaining underground waterline and drain lines that were not removed during the above demolition activities should be removed prior to final grading and stabilization of the site. Any large stormwater pipes, on the project site, that convey drainage from off-site should remain in place. Dispose of demolition materials offsite. Backfill trenches with suitable material, compact, and re-seed.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	10	$35,000
Pavement Removal, Finished Grading, and Ground Stabilization	Any existing pavement that is remaining will need to be removed from the site. All disturbed areas on the site need to be graded and seeded. Existing topsoil should be stockpiled for reuse. Final grading should allow for overland drainage that meets the existing drainage patterns on the site.	Keynote #14 on Overall Site Plan in Appendix C	Remove any pavement that is remaining on the site and dispose of offsite. All debris such as rocks, stumps, wood, building debris, and rubble should be removed from the soil during final grading activities. Any topsoil that was stockpiled during demolition activities should be replaced after areas have reached final grade. Graded areas will need to be prepared for seeding by tilling or ripping the topsoil. Once the soil has been scarified, the soil should be fertilized, planted with native grassy vegetation, and mulched.	Refer to Section 4.0 for permitting and regulatory requirements.	A specialized landscape contractor may be used to perform the final vegetative stabilization of the site.	25	$412,800
Maintenance Building Removal	The existing maintenance building was constructed during the treatment upgrades in the mid-1990's. The building is a 100' x 60' metal-framed structure with metal siding and a pitched, metal roof that sits on a 6" reinforced concrete slab with reinforced concrete footings for the metal columns. The building has three 25' wide maintenance bays, a 25' wide work area, a wood-framed compressor room, a wood-framed bathroom, and an exterior loading dock.	Keynote #15 on Overall Site Plan in Appendix C	No dewatering should be needed prior to beginning demolition of the maintenance building. Demolition of the lab building will begin in the inside and end with demolition of the exterior walls, roofing, and the foundation. First, demolish all interior walls, appurtenances, and metalworks. Next, begin dismantling the maintenance building from the top down, removing all roofing, walls, framing, and the building foundation.	Refer to Section 4.0 for permitting and regulatory requirements.	Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.	7	$88,000
					Total	**142**	**$1,566,700**

Total Time for Completion = **142** **Days**

Total Cost for Completion = **$1,566,700**